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Recurrent malignant melanoma detected on fluciclovine (¹⁸F) PET/CT imaging for prostate cancer

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Short title as running head:

Melanoma recurrence detected on fluciclovine PET (43 characters)

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Conflict of interest

Author 1 receives research support from Blue Earth Diagnostics Ltd.

Unstructured abstract

A 66-year-old man presented with biochemical recurrence of prostate cancer and underwent fluciclovine (^{18}F) PET/CT to detect sites of recurrence. He had a history of resected truncal stage IIIC malignant melanoma, with bilateral axillary node involvement on sentinel node biopsy, in complete remission for 3 years.

Fluciclovine (^{18}F) PET/CT demonstrated an incidental fluciclovine-avid right axillary node ($\text{SUV}_{\text{max}}=4.3$). Diagnostic sampling confirmed recurrent malignant melanoma.

Figure legend

A 66-year-old man with a history of radical prostatectomy for prostate cancer, presented with biochemical recurrence (prostate specific antigen level 0.32 ng/ml) and underwent fluciclovine (^{18}F) PET/CT to detect sites of disease recurrence. He also had a history of resection of a truncal stage IIIC 4-mm non-ulcerated malignant melanoma, with bilateral axillary node involvement on sentinel node biopsy, in complete remission for 3 years. While the site of prostate cancer recurrence was not demonstrated, an incidental fluciclovine-avid ($\text{SUV}_{\text{max}}=4.3$) 12-mm right axillary node was detected. Diagnostic sampling and subsequent right axillary node dissection two months later confirmed recurrent malignant melanoma.

Fluciclovine (^{18}F) / anti-1-amino-3- ^{18}F -fluorocyclobutane-1-carboxylic acid (FACBC) is a synthetic amino acid, recently FDA-approved for imaging recurrent prostate cancer¹. It is predominantly transported into cells by high-affinity glutamine transporter ASCT2, and leucine transporter LAT1^{2, 3}. There has been therapeutic interest in targeting glutamine metabolism by utilising ASCT2 inhibitors in melanoma⁴ as well as prostate cancer⁵, which in the case of melanoma, is fuelled by observation of a metabolic switch to glutamine dependence on developing resistance to BRAF inhibition^{6, 7}. Disease detection aside, this raises potential application in patient selection and response assessment to such emerging therapies.

Unlike fluorodeoxyglucose, which demonstrates non-specific uptake upon activation of both innate and adaptive immune response components, preclinical studies report uptake of fluciclovine only upon T- and B-cell activation, but not in granulocytes and macrophages⁸. Fluciclovine may therefore have the potential ability to selectively image T-cell modulation in the tumour microenvironment.

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